



Revision Number: 1

Purchasing Agent: DEBBIE GUNDERSEN  
(801) 538-3150

**Item: SATELLITE INTERNET SERVICE EQUIPMENT, INSTALLATION & MAINTENANCE**

Vendor: 94932A Lyman Brothers, Inc.  
10288 South Jordan Gateway  
#K  
South Jordan, Utah 84095

Internet Homepage: [www.lymanbros.com](http://www.lymanbros.com)

Telephone: (801) 501-9090

Fax number: (801) 984-0266

Contact: Bob Griffith

Email address: [jhanks@lbasat.com](mailto:jhanks@lbasat.com)

Brand/trade name:

Price: See Attached Price List  
Terms: Net 30  
Effective dates: 12/24/03 through 09/03/06  
Days required for delivery: 14 DAYS  
Price guarantee period: 1 YEAR  
Minimum order: None  
Min shipment without charges:  
Other conditions: See Page 2  
Renewal Options: Potential contract extensions through 09/03/08

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**EFFECTIVE DATE EXTENDED**

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This Statewide contract is an "AR" (Authorization Required) contract. Authorization is required before purchase can be made. The Authorization Requirements and Procedure is detailed in the attachment to the contract. Order may be placed only after authorization is received. This contract covers only those items listed in the price schedule. It is the responsibility of the agency to ensure that other items purchased are invoiced separately. State agencies will place orders directly with the vendor (creating a PG in Finet) and make payments for the same on a PV referencing the original PG. Agencies will return to the vendor any invoice which reflects incorrect pricing.



AUTHORIZATION REQUIRED: DAS/ITS (DEPARTMENT OF ADMINISTRATIVE SERVICES, DIVISION OF INFORMATION TECHNOLOGY SERVICES) ADMINISTERS PURCHASES FROM THIS CONTRACT. STATE AGENCIES (EXECUTIVE BRANCH) MUST COORDINATE THEIR PURCHASE THROUGH DAS/ITS. STATE AGENCIES MAY CONTACT GARY EUBANKS AT 801-538-3659 OR DAVID LEE AT 801-537-9251 TO COORDINATE THEIR PURCHASE.

**SERVICE PRICING SCHEDULE A**

1. Monthly service cost-up link data 64 kbps, down link 64 kbps \$105.00/Mo.
2. Monthly service cost-up link data 128 kbps, down link 64 kbps \$221.00/Mo.
3. Monthly service cost-up link data 1024 kbps, down link 512 kbps \$1,766.00/Mo.

**EQUIPMENT SCHEDULE B**

4. Hardware cost fixed location:  
List by model # and cost etc. \$4,245.00/Unit  
Hardware cost portable Command Post  
List by model # and cost etc. \$40,776.00/Unit

**INSTALL SCHEDULE C**

5. Install cost fixed location \$680.00/Unit
6. Install Cost portable Command Post \$1,950.00/Unit
7. Hardware maintenance Cost \$170.00/Mo.



**Schedule A  
Monthly Recurring Service**

Effective August 1, 2003

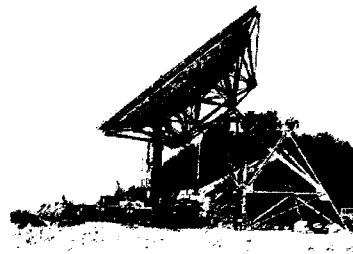
**SHARED CARRIER VSAT INTERNET ACCESS**

Shared Downstream	Shared Upstream	MRC (per terminal)
64Kbps	64Kbps	\$ 105.00
128Kbps	64Kbps	\$ 221.00
256Kbps	64Kbps	\$ 333.00
512Kbps	64Kbps	\$ 515.00
128Kbps	128Kbps	\$ 277.00
256Kbps	128Kbps	\$ 376.00
512Kbps	128Kbps	\$ 577.00
1Mbps	64Kbps	\$ 785.00
1Mbps	128Kbps	\$ 918.00
1Mbps	256Kbps	\$ 1,129.00
1.5Mbps	256Kbps	\$ 1,511.00
1.5Mbps	384Kbps	\$ 1,699.00
1.5Mbps	512Kbps	\$ 1,887.00
2Mbps	512Kbps	\$ 2,258.00
Other	<i>Custom Quotation</i>	

**Term:** All Pricing based on one year commitment.

**One-Time Commissioning:** \$250

**Service Includes:** 2 usable static IP addresses (additional blocks available upon request)



A division of Lyman Bros. Inc

Bob Griffith

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10288 South Jordan Gateway, Suite K

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Fax 801-501-7338

State of Utah

Division of Information Services

### **Schedule B Equipment Costs**

Solicitation Number DG 4003

Prices do not include pipe mount

Remote Site Equipment Costs:

**Site with maximum 128Kbps uplink speed**

1.2 Meter Ku satellite antenna

2 watt BUC (Block Up Converter

NetModem 120 Satellite Modem

Cables and Installation hardware

\$4,245.00

Optional Non-penetrating mount

\$290.00

**Site with 256Kbps and 512Kbps uplink speed**

1.8 Meter Ku satellite antenna

4 watt BUC

Netmodem II Plus (9.9Mbps x 4.5Mbps max)

Cables and Installation Hardware

\$7,168.00

Optional Nonpenetrating mount

\$440.00

**Portable Command Location**

1.2 meter

Model 1207 MVSAT with Roto-Lok drive and Az El Control

\$14,030.00

Transceiver Boom mounting Kit

Inc.

Vehicle Van Adapter

\$2,242.00

Control System

AvL-3050S Smart Jog Controller

\$5,175.00

RC-3000A+Fg/GPS Satellite Controller with fluxgate GPS

\$12,063.00

RC-3000RC Hand-Held Remote Control

\$632.00

NetModem IIPlus

\$4,560.00

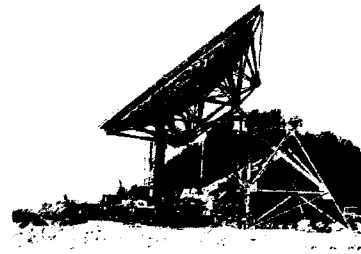
4 watt BUC

\$1,944.00

60° LNB

\$130.00

**Total \$40,776.00**



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State of Utah

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### **Schedule C Installation Costs**

Solicitation Number DG 4003

#### **Remote Site Installation**

Remote equipment will be installed in Utah at the rate of \$600.00 per site including travel.

Civil work will need to be completed before arrival of the technician. Civil work includes 110v AC power to the Netmodem and installation of the pipe mount at the location

Training can be provided for your technical staff to perform installations at the rate of \$300.00 per day. A typical training requires two days. We can also travel to your site for training with the addition of travel costs.

#### **Portable Command Post Installation Costs**

Costs vary for installation depending on the type of vehicle. A typical van type vehicle integration would be \$1950.00 and would include roof mounting the antenna system, RF, and modem. Also included are complete configuration, testing and programming the antenna control system.

#### **Technical and Maintenance Costs**

Included with each recurring service cost:

24 x 7 monitoring and notification of down system

Level one phone support including troubleshooting with onsite personnel

#### **Travel Maintenance**

Local, Salt Lake Area onsite support will be performed at the hourly rate of \$65.00.

Remote location support will be performed at the hourly rate of \$65.00 per hour or \$600.00 per day which ever is less plus \$1.00 per vehicle mile, and food and lodging expenses.



**SATELLITE COMMUNICATIONS**

**Attachment A 1.2 meter portable Command Post Specifications**

**Mechanical**

Reflector 1.2 M Prime Focus Offset

Mount Geometry Elevation over Azimuth

Polarization Rotation of Feed

Travel

Azimuth

Limited Motion 360° in four overlapping  $\pm 95^\circ$  Sectors

Full Coverage  $\pm 200^\circ$  Roto-Lok from stow position

Elevation

Standard Configuration 0-67° of reflector boresight

Optional Configuration 0-90° of reflector boresight

Polarization  $\pm 95^\circ$  for 2-Port

Speed

Slewing/Deploying 2°/second

Peaking 0.2°/second

Motors 24V DC Variable Speed, Constant Torque

RF Interface

ODU Mounting Feed Boom or Rear of Reflector

Waveguide WR 75 Flex Waveguide from Feed

Coax RG59 run from feed to base plus 15 ft.

Electrical Interface 25 ft. Cable with Connectors for Controller

Mechanical Interface Optional Pallet for Installation on most SUV and Van

Models

Manual Drive Handcrank for Az and El Axis

Weight 150 lbs.

**Environmental**

Wind

Survival

Deployed 60 mph

Stowed 80 mph

Operational

Tracking 45 mph at 60° F

Temperature

Operational -20°F to 125°F

Survival -40°F to 140°F

## **1.2M MOBILE VSAT ANTENNA SYSTEM**

### **Electrical RF Receive Transmit**

Frequency 10.95-12.75 GHz 13.75-14.5 GHz

Gain (Midband)

R/T 42.0 dBi 43.5 dBi

VSWR 1.30:1

Beamwidth (degrees)

-3 dB 1.5 1.2

-10 dB 2.6 2.1

First Sidelobe Level ( $\pm 2$  dB) -20 dB -20 dB

Radiation Pattern Meets FCC, Intelsat, ITU-R Requirements

Antenna Noise Temperature

30° Elevation Angle 30°K

Polarization Linear Linear

Power Handling Capability 25 Watts Maximum

Cross-Pol Isolation

On-Axis 35 dB 35 dB

Off-Axis (within .5 dB BW) 32 dB 32 dB

Off-Axis (within 1 dB BW) 30 dB 30 dB

Feed Port Isolation

RX/RX 30 dB

TX/RX 60 dB 60 dB

### **Controller**

Type

Jog Automatic Deploy and Stow, Front Panel Jog of Az, El and Pol

Smart Jog Finds Preprogrammed Satellite within Limited Geographical Area

Fully Automatic Finds Any Satellite, Anywhere in the World

Size Two Rack Units High

Input Power 110V AC, 1 ph, 60 Hz, 15 amp or 220V AC, 1 ph, 50 Hz, 8 amp

## NetModem II+ Specifications Sheet



### **Network Configuration**

Network Topology	Star
Multiple Access	TDM (Downstream) Multi-Frequency TDMA (Upstream) Configurable number of Upstream Carriers per Downstream Configurable frame length, configurable number of slots/frame
Data Rates	Downstream: 1Mbps – 9.1Mbps (QPSK) Upstream: 64Kbps – 4.6Mbps (QPSK)
FEC	Downstream: Turbo Product Coding (TPC) Rate 0.793 Upstream: TPC Rate 0.793 or TPC Rate 0.66

### **Interfaces**

SatCom Interfaces	TxIF: Type-F, 950 - 1700 MHz RxIF: Type-F, 950 - 1700 MHz TVRO: Type-F, 950 - 1700 MHz
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Data Interfaces	LAN: RJ45, Cat 5 UTP/STP 10/100 Base-T Ethernet (IEEE 802.3)
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RS-232: RJ45 (for GPS or Console connection)

LAN Protocols Supported	TCP (Accelerated), Proprietary QOS, UDP, ICMP, IGMP, RIP Ver2, NAT, DHCP, DNS Caching
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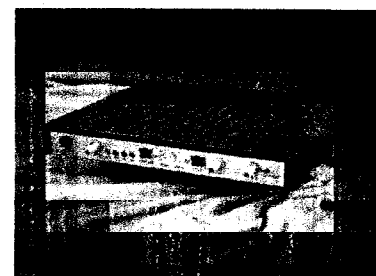
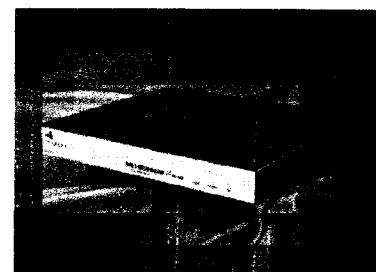
### **Mechanical/Environmental**

#### **Outdoor Unit**

Antenna Size	Ku-Band: 0.96m, 1.2m, 1.8m, 2.4m C-Band: 1.8m, 2.4m
LNB	DRO
Block Up Converter (BUC)	Ku Band: 1 Watt, 2 Watt & 4 Watt C Band: 2 Watt & 5 Watt
Operating Temperature	-40 <sup>0</sup> to +45 <sup>0</sup> C (-40 <sup>0</sup> to +113 <sup>0</sup> F)

#### **Indoor Unit**

Size	W 11.75" x D 10.50" x H 1.75" (W 29.9 cm x D 26.7 cm x H 4.5 cm)
Weight	7 lbs (3.18 Kg)
Operating Temperature	0 <sup>0</sup> to 50 <sup>0</sup> C (+32 <sup>0</sup> to +122 <sup>0</sup> F)
Input Voltage	100-250 VAC Universal Input, 2A Max @ 100VAC





## Hub System Information and specification iDirect Downstream (Forward) and Upstream (Return) Channels

Traffic over the iDirect satellite network consists of both the broadband downstream (forward) channel from the Hub to the Remotes, and the multiple upstream (reverse) channels from the Remotes to the Hub. The bandwidth on the upstream channel is lower than the downstream channel for various reasons. The most cost-effective way to utilize this expensive bandwidth is to be able to keep the satellite capacity used to the maximum, by statistically allocating this bandwidth among many users or sessions. TCP/IP protocol based applications are inherently bursty and asymmetric in nature.

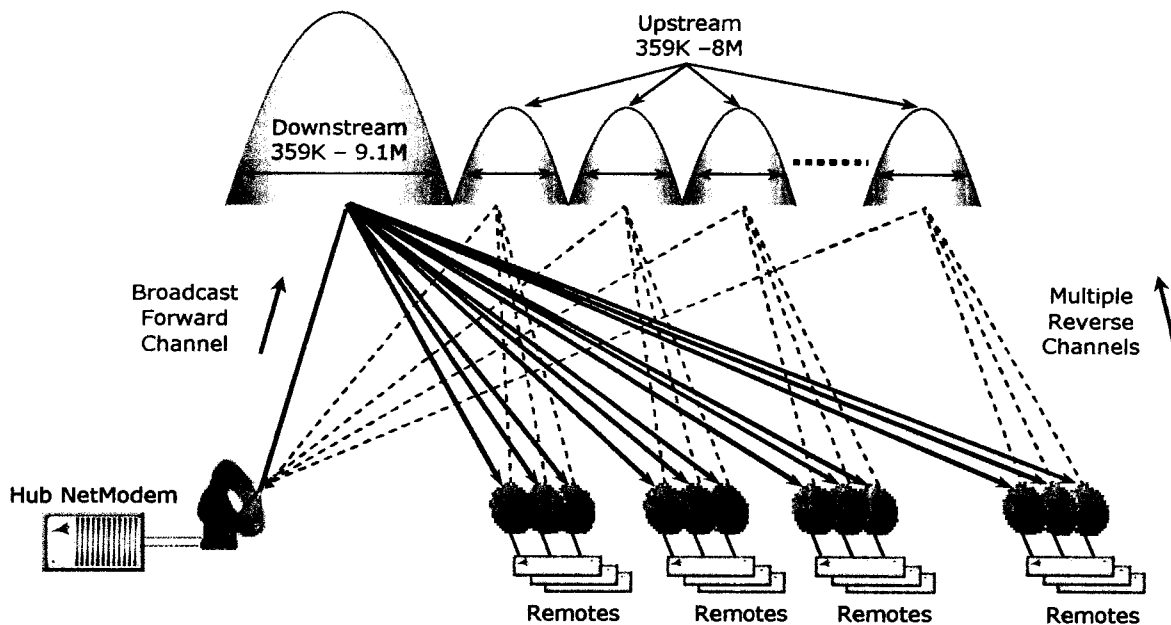


Figure 1: Downstream and Upstream Channels

*Note: Multiple Upstream Configuration Available in Q1 '02 (Software Only Upgrade).*

### The Downstream (Forward) Channel

The downstream (forward) channel on the iDirect system can be configured for very high capacities. This configuration can be as low as 359 Kbps to as high as 9.1 Mbps. The operator has the flexibility to design networks that meets the organizational needs. On the same transponder the one can configure networks that have different capacities. This flexibility give the network operator many options in designing and maintaining the most optimal networks. In the forward channel all packets are encoded with a specific hardware address for each remote equipment or NetModem. This ensures that only the right traffic is gets to the right destinations. The bandwidth destined to each remote can be rate-shaped to very specific bit-rates. Thus ensuring compliance of SLAs by the network operator.

## SATELLITE COMMUNICATIONS

In addition to rate shaping and error correcting techniques, iDirect has the most advanced TCP optimization for satellite networks. TCP/IP protocol was designed for low-latency terrestrial lines. Thus slow-start, windowing, and session management have tremendous throughput issues over satellite links. iDirect's TCP Acceleration mitigates these issues with regards to latency. The technology provides the most effective TCP/IP throughput in the industry. iDirect has demonstrated line-rate TCP throughput over the satellite.

### The Upstream (Reverse) Channel

The iDirect system utilizes Time-Division-Multiple-Access (TDMA) technique to allow the remote equipment to transmit to the Hub. In a TDMA scheme, the time slots can be allocated either as a fixed number to each remote or dynamically allocated based on various parameters. Dynamically allocating these time slots gives the most efficient use of the bandwidth that is available to the remotes. Figure 2 illustrates how iDirect TDMA system works. Each remote transmits data to the Hub, according to the time slots assigned to it. This provides each remote system some level of guaranteed bandwidth to transmit data to the Hub. This technique is not the most efficient way of utilizing the expensive Satellite bandwidth, since data may not be present at all times.

To provide a better and more efficient method of utilizing the satellite capacity, a dynamic allocation of time slots to each remote is a very effective technique.

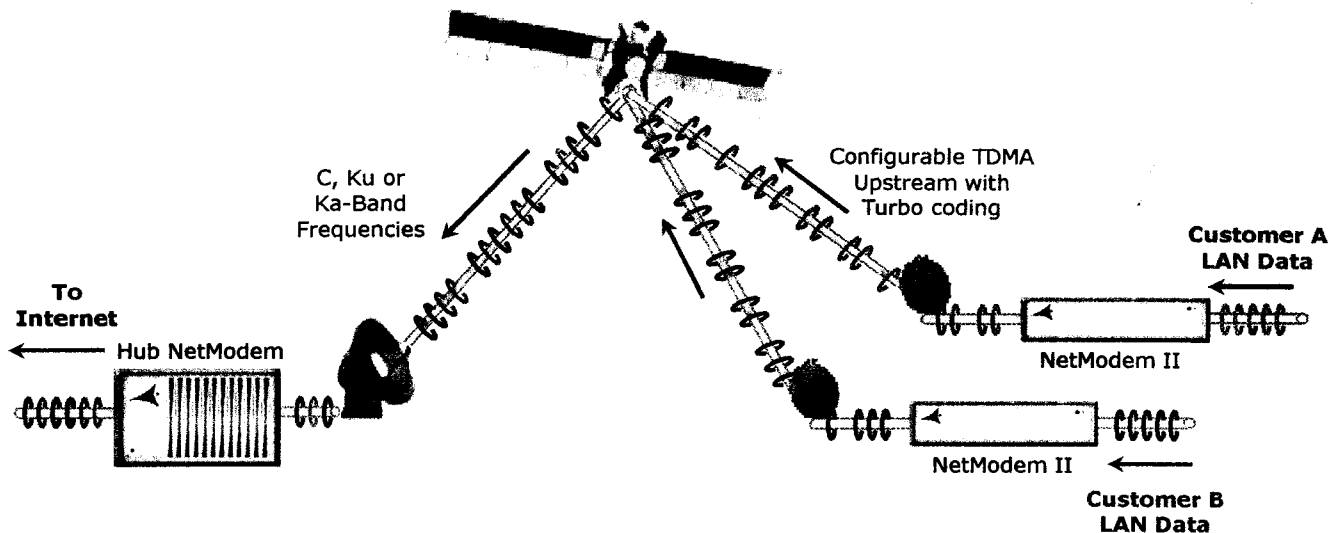


Figure 2: iDirect TDMA Return Channel

### Dynamic Allocation Technique

The Protocol Processor at the Hub site is at the heart of the iDirect Dynamic Allocation algorithm. Each remote NetModem sends bandwidth request to the Protocol Processor based on various parameters. This request is piggybacked on actual data packets, thus providing a very efficient use of bandwidth. The Protocol Processor evaluates requests of all remotes on a frame-by-frame basis and sends slot allocation information to all remotes once

## SATELLITE COMMUNICATIONS

every burst interval. The interval at which this information is sent to each remote is configurable by the operator. A typical burst happens once every 60 milliseconds. The Protocol Processor uses the management frame to send time slot assignments to all remotes that are a part of one network. Time slot allocation is based a number of parameters and has a fairness algorithm associated with it. The fairness algorithm that is built in to slot allocation ensures that each remote gets a fair share of time slots on the return channel. The parameters taken into consideration are,

- Bandwidth configured to the remote
- QoS Configurations (CIR, Rate Shaper, Prioritization)
- Queue depths on the remote
- Hysteresis that is based upon
  - Instantaneous load
  - Average rate of change of traffic

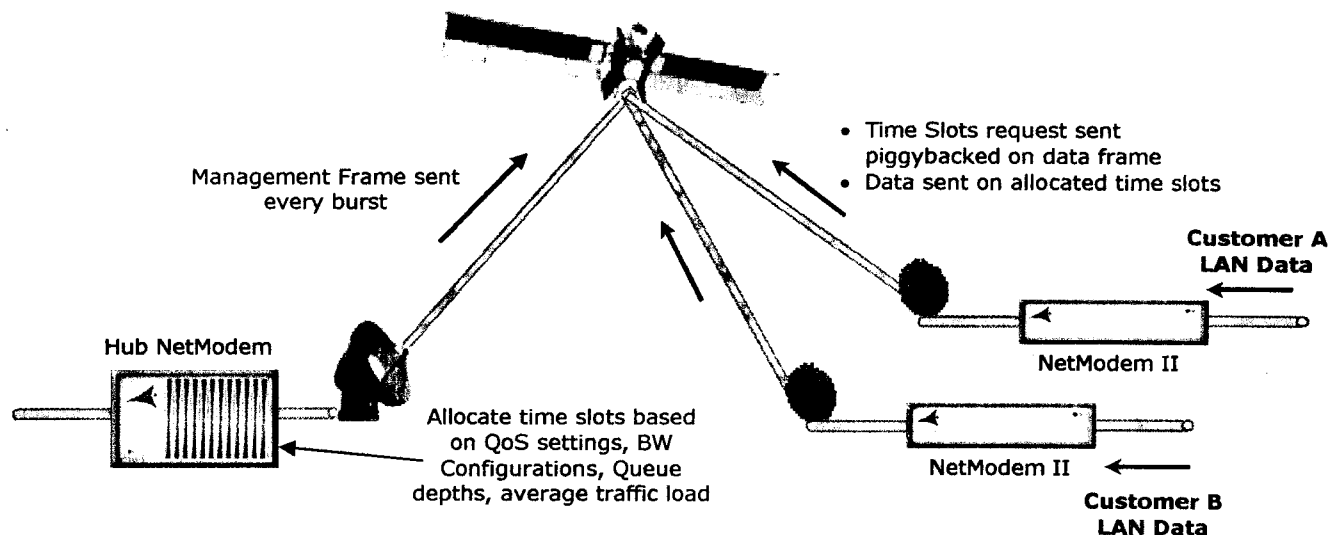
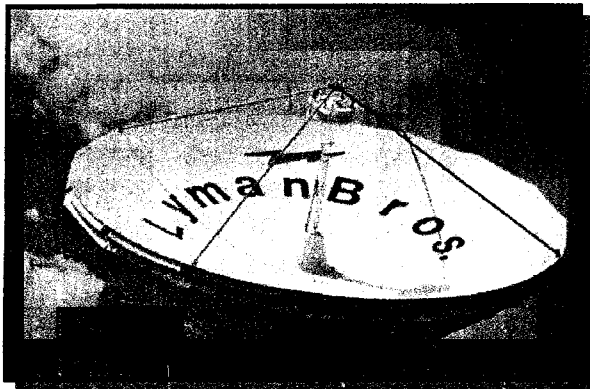


Figure 3: iDirect Dynamic Allocation

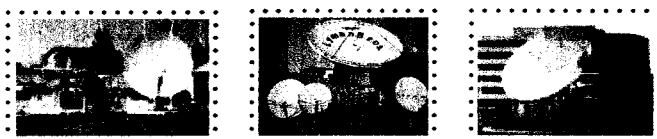
Figure 3, illustrates the dynamic allocation technique. This ensures a very efficient and cost-effective use of satellite capacity. Each burst interval has data that is sent from all remotes, in their specific time slots. This provides the operator the flexibility of managing the network to their requirement, at the same time getting the benefits of a satellite system.



# **LBI Sat** **SATELLITE COMMUNICATIONS**

## **Satellite Communication Services**

LBI Sat can be your one stop source for telecommunications hardware. We have the ability, through manufacturers' agreements, to buy materials at discounted prices that we can pass on to our customer. We are fully capable of providing all of the materials that may be needed for any size of job, including telephone equipment, satellite terminals, microwave equipment, and more.



LBI Sat specializes in transportable satellite telecommunications systems. We can provide completely self-contained systems that can be deployed anywhere in the world. Trailer mounted satellite systems are quick-deployable systems, which can be on the air within 1 hour of arrival on location. Data rates available range from 9.6 Kbps to over 10MBps. The trailer units are completely self contained, including 2.4 meter antenna, environmentally controlled equipment shelters, generator power, and UPS backup.

LBI Sat has a large inventory of equipment available for lease or short term rental.

These items include:

- Telephone PBX and other ancillary equipment
- Transportable satellite terminals
- Trailer mounted satellite terminals
- C and KU band transceivers
- TWTA and SSPA Amplifiers
- Satellite Modems
- Satellite antenna systems from 1.2 to 4.5 meter
- Data multiplexing equipment
- Routers
- Voice compression and multiplexing equipment
- Spread Spectrum digital radios, 128, 256, or 512 Kbps
- Spread Spectrum 10 Mbps LAN radios

## **Telecommunications Solutions**

Lyman Brothers is experienced in the design, engineering, building and prototyping, operation and management of multiple technology communications systems. Our personnel's experiences have placed them in Africa, Haiti, Bosnia, Hungary, Croatia, and elsewhere in support of several United States military missions. It takes a true expert to be able to provide communications services anywhere in the world. Imagine... Call waiting, forwarding, and voice mail in the jungles of Africa. Receiving your email in the middle of the deserts of Egypt, having a video teleconference with your boss from a mountain in Peru, receiving a FAX, surfing the World Wide Web from anywhere. Now close your eyes and imagine several hundred people doing this all at the same time without paying long distance charges. This is the power of our mobile communications solutions. Solutions are available immediately for LEASE or PURCHASE.

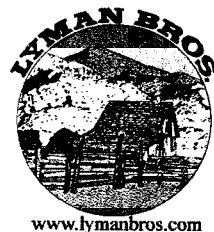
## **LBI Satellite Communication Services**

### ***LBI Sat***

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\*\*\*\*\*REPORTS\*\*\*\*\*

The contractor will submit yearly reports to the State Purchasing Agent (Debbie Gundersen) showing quantities and dollar volume of purchases by each agency and political subdivision. This report will be due by 09/05/04.

FINET COMMODITY CODE(S):  
92518000000-COMMUNICATIONS